Configuring SDLC Services

Router Software Version 11.0
Site Manager Software Version 5.0

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Bay Networks

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About This Guide

If you configure and manage Synchronous Data Link Control (SDLC) services for Bay Networks routers, refer to this guide for

- An overview of the SDLC protocol and its client protocols (Chapter 1)
- Implementation notes that may affect how you configure SDLC services (Chapter 2)
- Instructions on enabling SDLC services on the router (Chapter 3)
- Instructions on editing SDLC parameters (Chapter 4)
- SDLC default parameter settings (Appendix A)

For information and instructions on starting up and managing Bay Networks router configurations, refer to *Configuring Routers*.

Audience

Written for system and network managers, this guide describes the Bay Networks implementation of SDLC for networks containing Bay Networks routers. You should be familiar with the IBM networking concepts associated with the Systems Network Architecture (SNA) and SDLC.

Before You Begin

Before using this guide, you must complete the following procedures:

- Open a configuration file.
- Specify the router hardware, if this is a local-mode configuration file.
- Select the connector on which you are enabling SDLC.

Refer to *Configuring Routers* for instructions.

Conventions

This section describes the conventions used in this guide.

angle character (>)	Separates menu and option names in instructions. Example: Protocols > SDLC identifies the SDLC option in the Protocols menu.
bold text	Indicates text that you need to enter and command names in text. Example: Use the **dinfo** command.
brackets ([ ])	Indicate optional elements. You can choose none, one, or all of the options.
italic text	Indicates variable values in command syntax descriptions, new terms, file and directory names, and book titles.
quotation marks (“ ”)	Indicate the title of a chapter or section within a book.
`screen text`	Indicates data that appears on the screen. Example: `Set Bay Networks Trap Monitor Filters`
vertical line (|)	Indicates that you enter only one of the parts of the command. The vertical line separates choices. Do not type the vertical line when entering the command. Example: If the command syntax is **show at routes** | **nets**, you enter either **show at routes** or **show at nets**, but not both.

Acronyms

AN	Access Node
APPC	Advanced Peer-to-Peer Communications
APPN	Advanced Peer-to-Peer Networking
ASN	Access Stack Node
CP	Control Point
DLSw	Data Link Switching
FEP	front-end processor
IEEE	Institute of Electrical and Electronic Engineers
LAN	local area network

LLC	logical link control
MAC	Media Access Control
MCT1	Multichannel T1
NetBIOS	Network Basic Input-Output System
NRZ	non-return to zero
NRZI	non-return to zero inverted
PDU	protocol data unit
PU	physical unit
RFC	Request for Comments
SAP	service access point
SDLC	Synchronous Data Link Control
SNA	Systems Network Architecture (IBM)
XID	exchange identification

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Sydney, Australia	(612) 9927-8800	(612) 9927-8811
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Chapter 1
Synchronous Data Link Control Overview

This chapter describes the following Synchronous Data Link Control (SDLC) features and services:

- SDLC networking
  - -- Link station roles
  - -- Primary SDLC support
  - -- Secondary SDLC support
  - -- Enhanced synchronous pass-through
  - -- Transmission capabilities
  - -- SDLC support over MCT1 links
  - -- Physical connections
  - -- Frame format
- Using APPN and DLSw services with SDLC

Read this chapter if you are configuring Advanced Peer-to-Peer Networking (APPN) or Data Link Switching (DLSw) networks. SDLC parameter settings can influence APPN and DLSw performance.

SDLC Networking

SDLC is the synchronous, bit-oriented link control protocol in the IBM Systems Network Architecture (SNA). SDLC's connection-oriented protocol operates with the Data Link Switching (DLSw) protocol and the Advanced Peer-to-Peer Networking (APPN) architecture.

SDLC supports point-to-point and multipoint topologies. In point-to-point topologies, only one SDLC device connects to the SDLC port. In multipoint topologies, several SDLC devices connect to the SDLC port via a modem-sharing type device.

SDLC Features

You can configure most of the following features using the SDLC parameters described in Chapter 4.

Link Station Roles

A link station is a logical connection between adjacent nodes, where one node is a primary link station and the other, a secondary link station. Only one link station on an SDLC line can be the primary station; all others must be secondary. SDLC supports primary, secondary, and negotiable link stations.

In DLSw configurations, a Bay Networks router must be configured as either a primary or secondary link station. When primary, the router communicates with downstream PU 2.0 and PU 2.1 nodes; when secondary, with front-end processors and similar communications controllers. A secondary router functions as a PU 2.0 device.

In APPN configurations (PU 2.1 devices only), a Bay Networks router supports negotiable link stations, where the two link stations exchange XIDs to negotiate which one will be primary and which secondary.

Primary SDLC Support

A Bay Networks router configured as a primary device on an SDLC link can

- Control the data link
- Issue commands
- Initiate error-recovery procedures

The primary link station addresses and sends command frames to any or all secondary link stations on the network. Each frame carries the individual, group, or broadcast address of the station or stations to which the frame is directed. A secondary link station receives commands and responds to primary link station polls.

Figure 1-1 illustrates DLSw single and dual switch networks where Bay Networks routers perform as primary SDLC nodes.

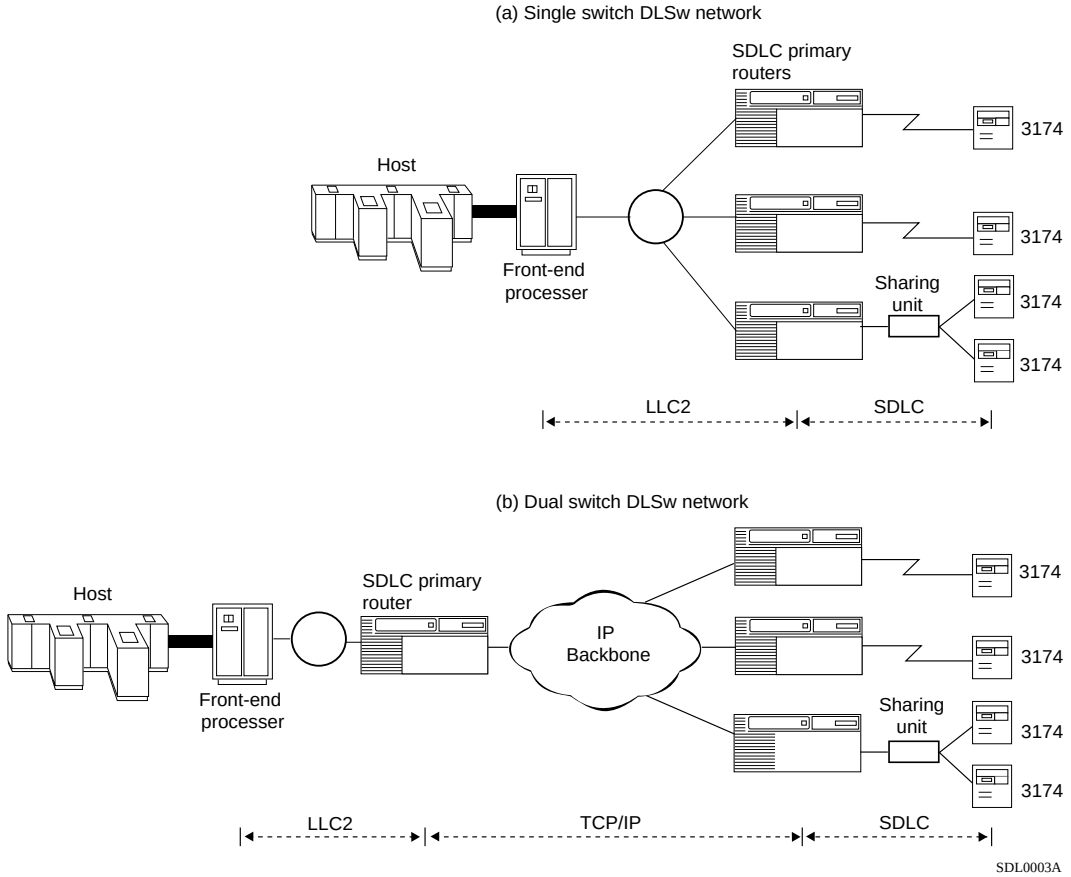

Figure 1-1. Primary SDLC Routers in (a) Single and (b) Dual Switch DLSw Networks

Secondary SDLC Support

A Bay Networks router acting as a secondary device on an SDLC link can

- Support a single SDLC link communicating to a front end processor (FEP) or similar SNA device
- Serve as a secondary PU 2.0 device on that link
- Coexist with other secondary SDLC devices, (PU 2.0 or PU 2.1) on the same SDLC link
- Allow SNA devices attached to multiple remote routers to share a single SDLC link to the FEP
- Attach to the FEP directly (using a null modem cable) or via a leased line

Figure 1-2 illustrates DLSw single and dual switch networks where Bay Networks routers serve as secondary SDLC nodes.

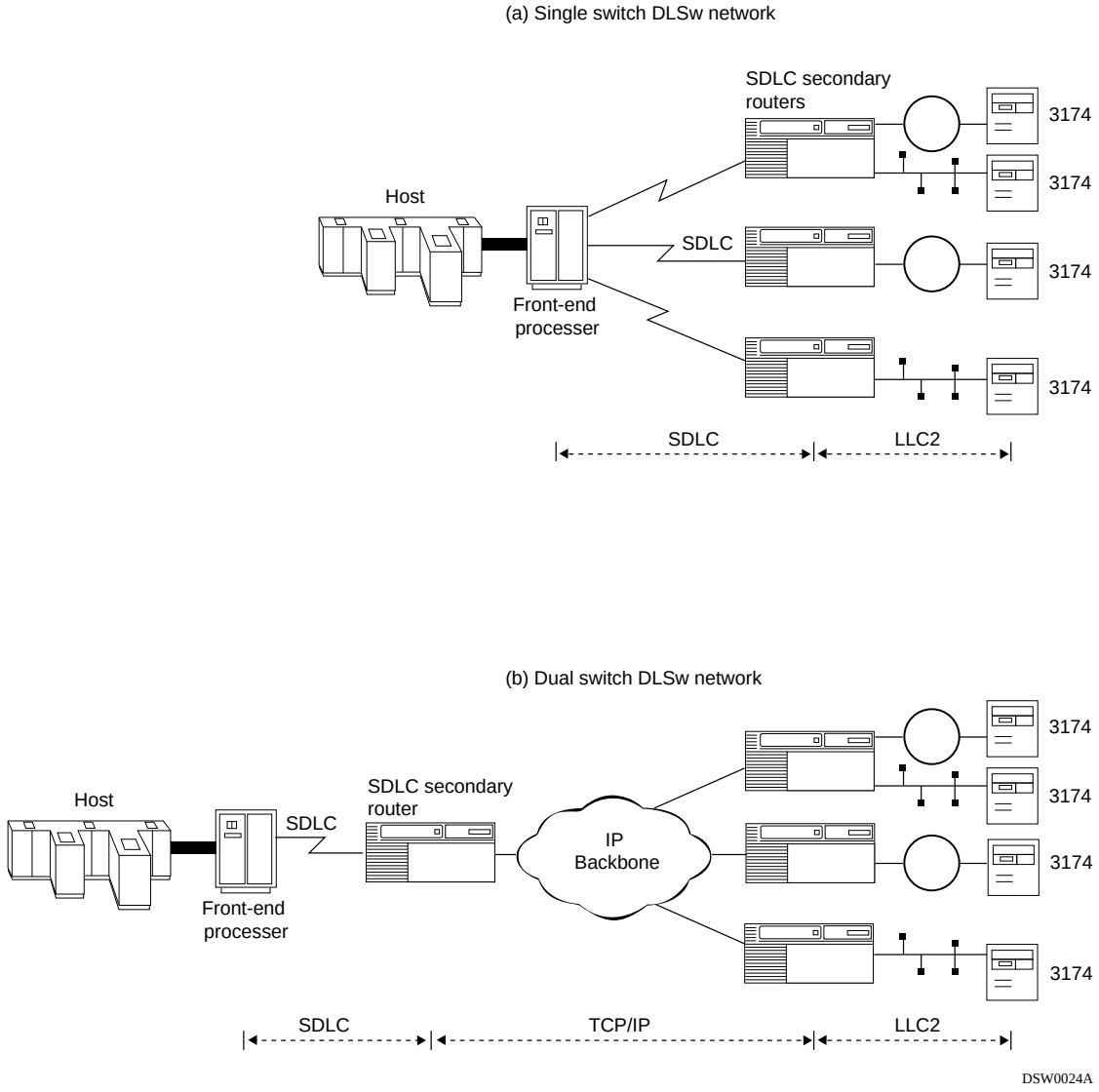

Figure 1-2. Secondary SDLC Routers in (a) Single and (b) Dual Switch DLSw Networks

Secondary SDLC Limitations

Bay Networks routers configured as secondary SDLC link stations function as PU 2.0 devices only.

Secondary SDLC Configuration

The DLSw Mode parameter allows you to configure primary or secondary operations on DLSw interfaces and SDLC local devices. Refer to *Configuring DLSw Services* for information on the DLSw Mode parameter.

Enhanced Synchronous Pass-through

Using primary and secondary SDLC services, a network can transport existing SDLC traffic over a router-based topology that

- Enables existing SDLC traffic to use a high-speed multiprotocol backbone network
- Simplifies the migration to a router-based network, by incorporating SDLC traffic into the multiprotocol backbone without converting the existing endstations
- Provides local acknowledgment of the SDLC protocol at each side of the router-based network, eliminating polling and acknowledgment traffic from the network backbone
- Allows high-speed links into the FEP, improving response time

Figure 1-3 illustrates locally acknowledged synchronous pass-through using single and dual switch services.

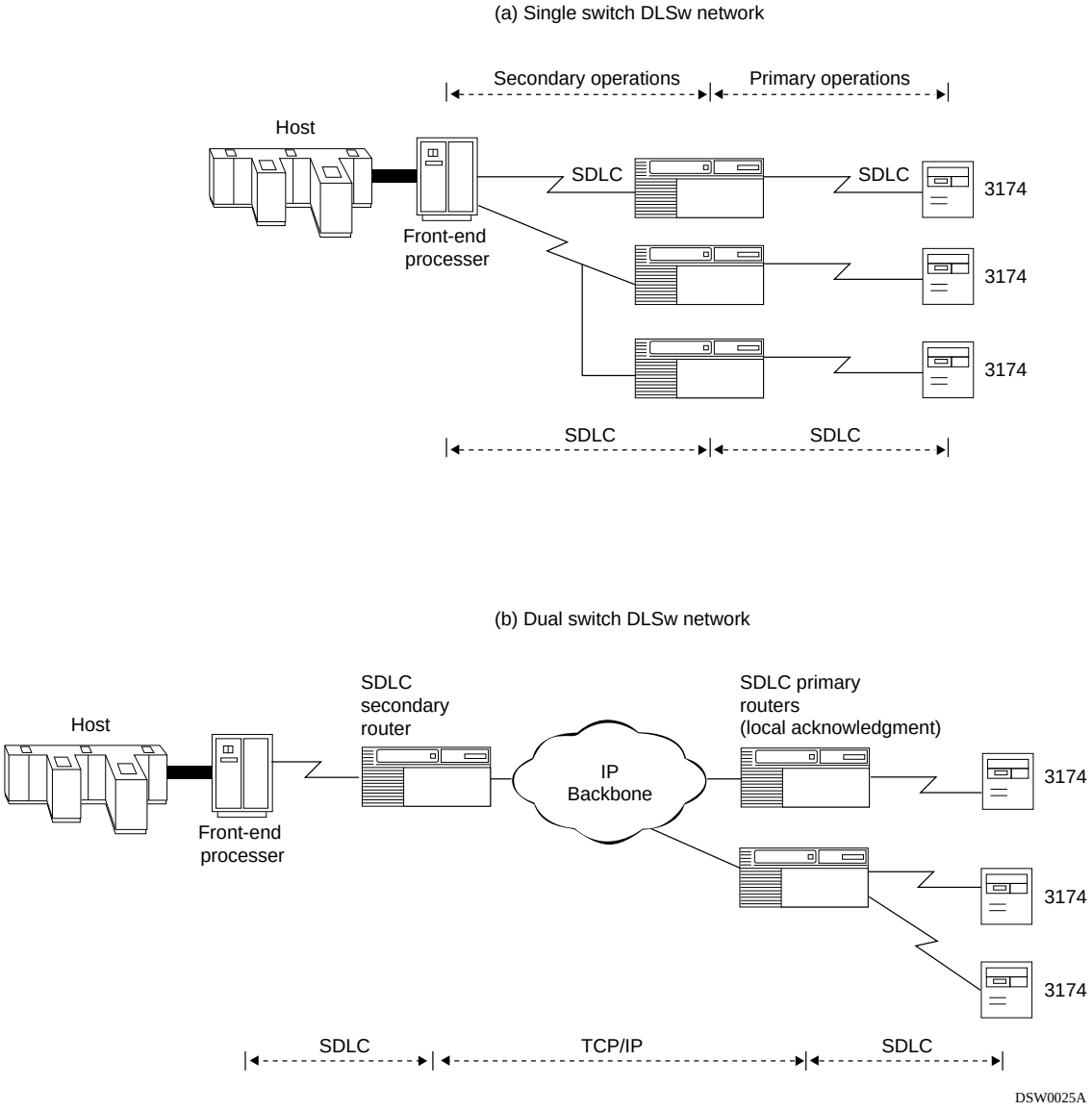

Figure 1-3. Locally Acknowledged Synchronous Pass-through in (a) Single and (b) Dual Switch DLSw Networks

Transmission Capabilities

SDLC supports full- and half-duplex transmissions over leased lines. Full-duplex data transmissions can occur in both directions (between primary and secondary link stations) at the same time. Half-duplex transmissions can occur in only one direction at a time.

SDLC Support over MCT1 Links

Version 11.0 supports SDLC over Multichannel T1 (MCT1) links (connectors labeled MCT1) for SNA transmission over DLSw wide areas. The router must contain at least one MCT1 link module and you must select SDLC from the WAN Protocols window. For more information on configuring MCT1, refer to *Configuring Line Services*.

Physical Connections

SDLC communicates with attached SNA/SDLC devices using V.24 (RS-232), V.35, and X.21 (nonswitched) connections. SDLC supports line speeds up to 64 Kb/sec, depending on the physical connection. For example, V.24 interfaces can operate at speeds up to 19.2 Kb/sec, while V.35 interfaces can operate at speeds up to 64 Kb/sec.

Frame Format

SDLC sends and receives three types of frames:

- *Supervisory frames* transmit ready or busy status, control polling, and request retransmission when an error occurs or when frames arrive out of sequence.
- *Information frames* transmit data.
- *Unnumbered frames* control initialization and status reporting.

Figure 1-4 illustrates the format of SDLC frames.

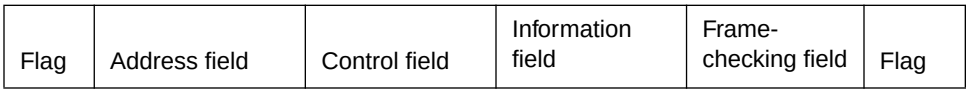

Figure 1-4. SDLC Frame Format

Each frame begins with a one-byte flag that alerts the receiver to the frame's presence.

The address field is a one byte field that identifies the secondary link station that communicates with the primary link station. In a poll, the Address field identifies the station being polled. In a response, this field identifies the transmitting secondary station.

The control field is one or two bytes long and identifies the function of the frame. This field defines the frame format (supervisory, information, or unnumbered).

The optional information field is a variable-length field (the length must be a multiple of eight bits).

A two-byte frame-checking field lets the receiving station check the received frame for errors.

A one-byte flag ends the frame.

Using APPN Services with SDLC

You can configure any SDLC interface for APPN services. APPN nodes can communicate with adjacent nodes using SDLC links over point-to-point and multipoint configurations. For information on the APPN node types and how to configure APPN, see *Configuring APPN Services*.

Using DLSw Services with SDLC

You can configure any SDLC interface for DLSw services. For information on DLSw, see *Configuring DLSw Services*.

For More Information about SDLC

For more information about SDLC and IBM SNA, refer to the following IBM publications:

- *IBM Synchronous Data Link Control: Concepts* (GA27-3093)
- *IBM System Network Architecture: Technical Overview* (GC30-30723)
- *IBM System Network Architecture: Concepts and Products* (GC30-3072)

- *Systems Network Architecture, APPN Architecture Reference* (SC30-3422-3)
- *APPN Architecture and Product Implementations Tutorial* (GG24-3669)
- *Data Link Switching: Switch-to-Switch Protocol RFC 1434*
- *Data Link Switching: Switch-to-Switch Protocol RFC 1795*

Chapter 2
SDLC Implementation Notes

Keep the following implementation notes in mind when you configure SDLC services.

Link Stations

With DLSw, you can configure SDLC as a primary or secondary link station only. With APPN, you can configure primary, secondary, and negotiable link stations.

You set up SDLC link stations as follows:

- Primary link stations -- configure the adjacent link station's parameters.
- Secondary link stations -- configure the station's own link station parameters.
- Negotiable link stations -- configure the station's own link station, as well as a potential adjacent link station.

Refer to Chapter 4 for information on configuring SDLC link stations.

Synchronous Line Parameters

When you add SDLC to a synchronous line, Site Manager opens the SDLC Line Parameters window, and you can then edit the following parameters:

- Clock Source
- Internal Clock Speed
- Sync Line Coding
- Cable Type
- RTS Enable

Chapter 3 describes how to complete the SDLC Line Parameters. To view or change synchronous line parameters that do not appear in the SDLC Line Parameters window, edit the line parameters of the desired circuit. For information on editing other synchronous line parameters, refer to *Configuring Line Services*.

Note: The BOFL (Breath of Life) parameter enables proprietary BOFL messages to travel over a point-to-point connection between the local router and a remote peer. If this parameter is enabled, set it to Disable so that these messages do not interfere with SDLC frames.

SDLC Timers

SDLC uses timers to manage traffic over SDLC links. You should edit the timer values whenever you adjust the speed of the line. If you configure SDLC on a link with a slow baud rate, the default values for SDLC timer parameters may not be adequate for the line.

For example, if you are using a line with a 4800 baud rate, increase the REPLYTO Timer parameter value in the SDLC Link Station Configuration window (refer to Figure 4-4) to 60 tenths of a second. Edit the REPLYTO Timer value whenever you adjust baud rate with the Internal Clock Speed parameter or the external modem baud rate.

Configurable Window Size

In SDLC, a window controls how many frames a link station sends before receiving an acknowledgment. Window size depends on which modulo your network's implementation of SDLC uses. Modulo 8 operation allows a maximum window size of 7; Modulo 128, a maximum of 127.

For example, with a window size of 7, a link station can transmit frames 0 through 6 before requiring acknowledgment from the receiving station. The sending station will not send more frames until it receives an acknowledgment.

You edit this window size with the MAXOUT parameter, described in Chapter 4.

Chapter 3
Enabling SDLC Services

This chapter describes how to enable SDLC services. It assumes you have read *Configuring Routers* and

1. Opened a configuration file.
2. Specified router hardware if this is a local-mode configuration file.
3. Selected the connector on which you are enabling SDLC, labeled either COM1, COM2, or MCT1.

When you enable SDLC services, you are required to specify only a few parameters. The Configuration Manager supplies default values for the rest. If you want to edit these parameters, see Chapter 4.

Enabling SDLC on an Interface

To enable SDLC on an interface:

1. **Select SDLC in the WAN Protocols window.**

   The Configuration Manager displays the SDLC Line Parameters window (Figure 3-1).

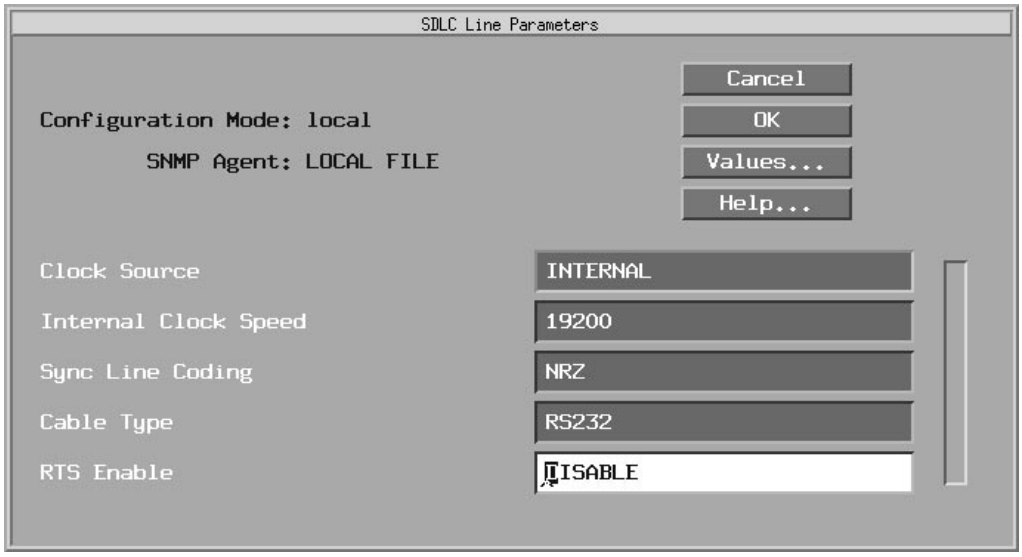

Figure 3-1. SDLC Line Parameters Window

2. **Configure the parameters.**

   Refer to the parameter descriptions in this chapter to configure the synchronous line parameters.

3. **Click on OK.**

   The Select Protocols window appears (Figure 3-2).

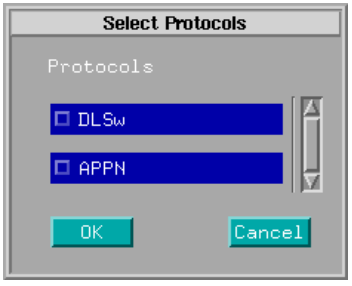

Figure 3-2. Select Protocols Window

4. **Select either DLSw or APPN to run on the SDLC circuit.**

   Site Manager then displays the appropriate windows from which you enable DLSw or APPN. For information on enabling DLSw and APPN, refer to *Configuring DLSw Services* and *Configuring APPN Services*.

SDLC Line Parameter Descriptions

Use the following parameter descriptions to configure the SDLC line parameters (Figure 3-1).

Parameter:	**Clock Source**
Default:	Internal on COM1, COM2, etc.; External on MCT1
Options:	External | Internal
Function:	Identifies whether the router provides clocking (INTERNAL) or receives clocking (EXTERNAL) from the other device. The parameter specifies the origin of the synchronous timing signals. If you set this parameter to Internal, this router supplies the required timing signals. If you set this parameter to External, an external network device supplies the required timing signals. Use this parameter when connecting the SNA equipment directly to the router. Either the router or the SNA equipment can define the speed of the SDLC link. You must configure one device to internal clocking, and the other device to external clocking.
Instructions:	For direct connection to a control unit, such as an IBM 3174, set to Internal. For connection to a modem, set to External. For direct connection to an IBM 3745, either the router or the IBM 3745 can provide the clock source. If the IBM 3745 does not provide clocking, set to Internal.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.13

Parameter: **Internal Clock Speed**

Default: 19200 KB

Options: 1200 B | 2400 B | 4800 B | 7200 B | 9600 B | 19200 B | 32000 B | 38400 B | 56 KB | 64 KB | 125 KB | 230 KB | 420 KB | 625 KB | 833 KB | 1.25 MB | 2.5 MB | 5 MB

Function: Sets the clock speed of an internally supplied clock when Clock Source is set to Internal. Attached devices must be capable of operating at the specified speed. Some of the more common allowed speeds for IBM products are as follows:

-- An IBM 3274 with an V.24/RS-232 interface supports up to 9600 bps. Some support speeds up to 19200 bps.

-- An IBM 3274 with a V.35 interface supports up to 64 Kb/s.

-- An IBM 3174 with a V.24/RS-232 interface supports up to 19200 bps.

-- An IBM 3174 with a V.35 interface and running Licensed Internal Code-C supports up to 256 Kb/s.

Instructions: Click on Values and set the clock speed for the internal clock to the desired data transmission rate across the synchronous line.

This parameter is unavailable when Clock Source is set to External.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.14

Parameter:	**Sync Line Coding**
Default:	NRZ
Options:	NRZ | NRZI | NRZI Mark
Function:	Sets the same line coding value for all devices attached to the same SDLC link. You can change the value of this parameter to match the line coding of a device at the other end of the line. This parameter is relevant only for the AN and ASN routers, and the Octal Sync module. Other Bay Networks router platforms use NRZ encoding. *NRZ* -- Indicates Non-Return to Zero encoding. *NRZI* -- Indicates Non-Return to Zero Inverted encoding. *NRZI Mark* -- Indicates Non-Return to Zero Inverted Mark encoding.
Instructions:	Select NRZ or NRZI. NRZI Mark is not generally used for SDLC.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.88

Parameter:	**Cable Type**
Default:	RS232
Options:	Null | RS232 | RS422 | V35 | X21
Function:	Specifies the cable interface to the network.
Instructions:	Click on Values and select the installed cable interface type.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.83

Parameter:	**RTS Enable**
Default:	Disable
Options:	Enable | Disable
Function:	Controls the toggling of the Request to Send (RTS) signal on the interface.
Instructions:	Click on Values and select Enable or Disable. For manual dial modems (2-wire), set this parameter to Enable. For leased modems (4-wire), set this parameter to Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.16

Chapter 4
Editing SDLC Parameters

Use the Configuration Manager to access, configure, and edit SDLC

- Global parameters
- Interface parameters
- Link station parameters

To edit SDLC parameters, you need to configure one SDLC interface. If you have not yet configured an SDLC interface, refer to Chapter 3.

You may want to customize para meters for DLSw or APPN as well, since they use SDLC services on the router. For information on DLSw, refer to *Configuring DLSw Services;* for APPN, refer to *Configuring APPN Services*.

Using the Parameter Descriptions

For each SDLC parameter, this chapter provides the following information:

- Default setting (parameter value that the system software sets; APPN and DLSw configurations may affect some SDLC default settings during operation)
- All valid options
- Function
- Instructions for setting the parameter value
- Management Information Base (MIB) object ID

The Technician Interface lets you modify parameters by issuing **set** and **commit** commands with the MIB object ID. This process is equivalent to modifying parameters using Site Manager. For more information about using the Technician Interface to access the MIB, refer to *Using Technician Interface Software*.

Caution: The Technician Interface does not verify that the value you enter for a parameter is valid. Entering an invalid value can corrupt your configuration.

Accessing SDLC Parameters

To access and edit SDLC parameters, begin at the Configuration Manager window and select Protocols > SDLC to display the SDLC options submenu (Figure 4-1).

Figure 4-1. Configuration Manager Window

Editing SDLC Global Parameters

SDLC has only one configurable parameter (Enable) visible at the global level. To change the setting of the global parameter, begin at the Configuration Manager window and proceed as follows:

1. **Select Protocols > SDLC > Global.**

   The Edit SDLC Global Parameters window appears (Figure 4-2).

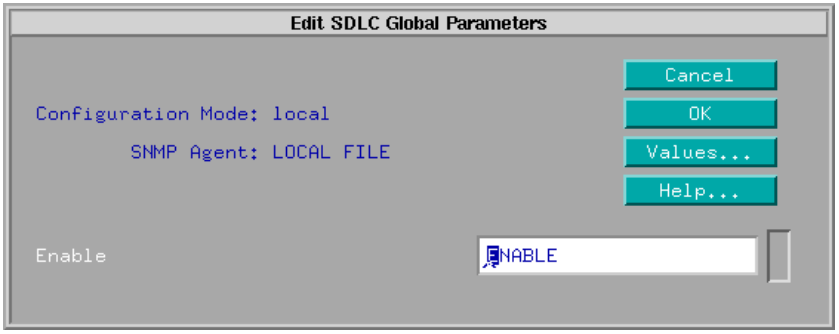

Figure 4-2. Edit SDLC Global Parameters Window

2. **Change the setting of the Enable parameter, if necessary.**

   Refer to the description of the parameter that follows this procedure.

3. **Click on OK to save your changes and exit the window.**

Parameter:	**Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables the system software mechanisms that use the SDLC interface on a synchronous circuit. The system software also performs the following actions when you choose a setting: Disable -- Switches every SDLC interface enabled on the router to the disabled (inactive) state. Enable -- Reinitializes every SDLC interface on the router, based on • The current setting of the associated interface Enable parameter • The current state of the associated circuit
Instructions:	Select Disable to switch every SDLC interface existing on the node to the inactive state. Select Enable only when an existing SDLC interface is in the disabled state. You can choose Enable to globally reinitialize all SDLC interfaces configured on the node. Then, each interface maintains the most recent setting of its own interface Enable parameter.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.1.2

Editing SDLC Interface Parameters

To access and edit the SDLC interface parameters, begin at the Configuration Manager window (refer to Figure 4-1) and proceed as follows:

1. **Select Protocols > SDLC > Interfaces.**

   The SDLC Interface Configuration window appears (Figure 4-3).

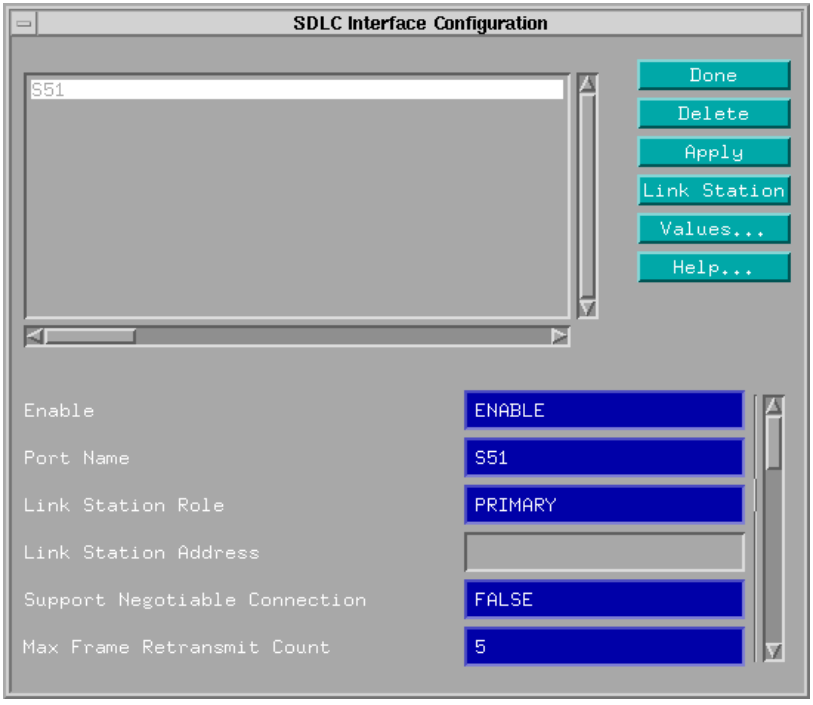

Figure 4-3. SDLC Interface Configuration Window

2. **Select the interface you want to customize.**

   The parameter values for that interface appear in the parameter value windows. (Click on Values to display the valid range of values for any parameter.)

3. **Edit the parameters you want to change.**

   Refer to the parameter descriptions in the next section.

4. **Click on Apply to save your changes.**

   Repeat Steps 2 through 4 for each interface you want to edit.

5. **Click on Done to exit the SDLC Interface Configuration window.**

SDLC Interface Parameter Descriptions

Use the following parameter descriptions to edit SDLC interface parameters.

Parameter:	**Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables the SDLC interface to this WAN physical circuit.
Instructions:	Select Enable if you disabled this SDLC interface and now want to re-enable it on its associated WAN physical circuit. Select Disable if you want to disable this SDLC interface on its associated WAN physical circuit.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.2

Parameter:	**Port Name**
Default:	APPN port name or DLSw circuit name
Options:	Any valid port name
Function:	Defines the port name you want to assign to this SDLC interface.
Instructions:	Enter the name of the port you want to assign to this SDLC interface. You can use any combination of alphanumeric characters. We recommend you use the same name assigned to the circuit on which you added SDLC, for example, S51.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.4

Parameter:	**Link Station Role**
Default:	PRIMARY for DLSw networks; NEGOTIATE for APPN networks
Options:	PRIMARY | SECONDARY | NEGOTIATE
Function:	Defines the link station role. With DLSw, you can configure only primary and secondary SDLC link stations. With APPN, you can configure primary, secondary, and negotiable link stations.
Instructions:	Enter PRIMARY or SECONDARY if you want to assign a specific role to the link station. Enter NEGOTIATE if you want the link station to exchange XIDs with another negotiable link station to determine which will be primary and which secondary.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.27

Parameter:	**Link Station Address**
Default:	4 for APPN networks, None for DLSw networks
Range:	1 through 254
Function:	Specifies the port address if the link station role is secondary or negotiable.
Instructions:	Enter a value from 1 through 254.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.29

Parameter:	**Support Negotiable Connection**
Default:	TRUE for APPN networks; FALSE for DLSw networks
Options:	TRUE | FALSE
Function:	Specifies whether this SDLC link station supports negotiable connections over APPN networks.
Instructions:	Enter TRUE if the SDLC link station supports negotiable connections; otherwise, enter FALSE.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.33

Parameter:	**Max Frame Retransmit Count**
Default:	5
Range:	1 through 7
Function:	Specifies the maximum number of times to retransmit a frame or group of frames.
Instructions:	Enter a value from 1 through 7.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.23

Parameter:	**Non-productive Timer**
Default:	2000 milliseconds
Range:	1 through 65535
Function:	Specifies the time allowed for receipt of a valid frame from the primary link station. This parameter operates with the Non-productive Retry Limit parameter. It is intended for secondary SDLC routers. SDLC primarily uses this timer to produce an outage when a secondary station produces continuous frames without setting the F-bit (Final bit). In large configurations with many SDLC connections, you should increase this value to allow more time for the primary link station to respond.
Instructions:	Enter a value from 1 through 65535.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.12

Parameter:	**Non-productive Retry Limit**
Default:	15
Range:	1 through 65535
Function:	Used with the Non-productive Timer parameter to provide the overall time before SDLC sends an outage message to the device.
Instructions:	Enter a value from 1 through 65535, where 1 causes SDLC to generate an outage after the first Non-productive Timer expires, and 65535 specifies an unlimited retry count.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.13

Parameter:	**Idle Line Timer**
Default:	6000 milliseconds
Range:	1 through 65535
Function:	Specifies the overall time used to determine whether a line is completely inactive. This parameter operates with the Idle Line Retry Limit parameter. It is intended for primary SDLC routers.
Instructions:	Enter a value from 1 through 65535. Enter the maximum value, 65535, if you never want to terminate sessions on the line, even if it is completely inactive. If you enter a smaller value, the timer expires when no activity occurs on the line for the specified number of milliseconds. In large configurations with many SDLC connections, you should increase this value to allow more time for data exchange.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.10

Parameter:	**Idle Line Retry Limit**
Default:	20
Range:	1 through 65535
Function:	Specifies the number of times to run the Idle Line Timer before failure. This parameter operates with the Idle Line Timer parameter to provide the overall idle timeout period.
Instructions:	Enter a value from 1 through 65535, where 1 causes SDLC to generate an outage after the first Idle Line Timer expires, and 65535 specifies an unlimited retry count.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.11

Parameter:	**Port Write Timer**
Default:	3000 milliseconds
Range:	1 through 65535
Function:	Specifies the maximum amount of time allowed to transmit a complete frame. This parameter operates with the Port Write Retry Limit parameter.
Instructions:	Enter a value from 1 through 65535.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.14

Parameter:	**Port Write Retry Limit**
Default:	10
Range:	1 through 65535
Function:	Used with the Port Write Timer parameter to provide the overall time allowed to transmit a complete frame before SDLC sends an outage message to the device.
Instructions:	Enter a value from 1 through 65535, where 1 causes SDLC to generate an outage after the first Port Write Timer expires, and 65535 specifies an unlimited retry count.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.15

Parameter:	**Link Connection Timer**
Default:	3000 milliseconds
Range:	1 through 65535
Function:	Used with the Link Connection Retry Limit parameter to provide the time interval after which SDLC fails to activate a port because it has not received a Data Set Ready (DSR) response. This feature is for switched lines only and is not currently implemented.
Instructions:	Accept the default. This parameter is reserved for future enhancements.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.16

Parameter:	**Link Connection Retry Limit**
Default:	10
Range:	1 through 65535
Function:	Specifies the number of times the link has been tested for a connection before it fails the pending Activate Port Request. The maximum value for this parameter specifies an infinite number of times. This parameter operates with the Link Connection Timer parameter.
Instructions:	Accept the default. This parameter is reserved for future enhancements.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.17

Parameter:	**Primary Full Duplex**
Default:	FALSE
Options:	TRUE | FALSE
Function:	Specifies whether the primary SDLC link station supports full-duplex data transmission.
Instructions:	Enter TRUE if the primary SDLC station supports full-duplex data transmission. Enter FALSE if the primary station supports half-duplex transmission.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.18

Parameter:	**Secondary Full Duplex**
Default:	FALSE
Options:	TRUE | FALSE
Function:	Specifies whether the secondary SDLC link station supports full-duplex data transmission.
Instructions:	Enter TRUE if the secondary SDLC station supports full-duplex data transmission. Enter FALSE if the secondary station supports half-duplex transmission.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.19

Parameter:	**Enable Reject Frame**
Default:	TRUE
Options:	TRUE | FALSE
Function:	Specifies whether SDLC can send a reject (REJ) command upon receiving an out-of-sequence Information frame. If the REJ command is not used, SDLC requests retransmission of frames through Receiver Ready (RR), Receiver Not Ready (RNR), or Information frames. The REJ command is useful only with full-duplex transmission.
Instructions:	Enter TRUE to use REJ commands for out-of-sequence Information frames; otherwise, enter FALSE.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.20

Parameter:	**Max XID Size**
Default:	256
Range:	2 through 256
Function:	Specifies the maximum XID size that will be sent or received on this link.
Instructions:	Enter a value from 2 through 256.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.22

Parameter:	**Max Frame Size**
Default:	PDU2057
Options:	PDU265 | PDU521 | PDU1033 | PDU2057
Function:	Specifies the maximum frame size SDLC supports. This value includes the transmission header (TH) and request header (RH).
Instructions:	Enter a frame size that is equal to or larger than the largest frame size that will be received.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.24

Parameter:	**Total Link Station Limit**
Default:	16
Range:	1 through 254
Function:	Specifies the total link station activation limit.
Instructions:	Enter the number of link stations (from 1 through 254) that you want to reserve for inbound and outbound activation on this port.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.30

Parameter:	**Inbound Link Station Limit**
Default:	8
Range:	1 through 254
Function:	Specifies the inbound link station activation limit.
Instructions:	Enter the number of link stations (from 1 through 254) that you want to reserve for inbound activation on this port.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.31

Parameter:	**Outbound Link Station Limit**
Default:	8
Range:	1 through 254
Function:	Specifies the outbound link station activation limit.
Instructions:	Enter the number of link stations (from 1 through 254) that you want to reserve for outbound activation on this port.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.32

Parameter:	**Receive Buffer Pool Size**
Default:	7
Range:	1 through 255
Function:	Sets the receive buffer pool size, that is, the number of buffers you want to preallocate for receiving frames from the line.
Instructions:	Enter the number of buffers you want for the receive buffer pool. You can enter a value from 1 through 255; however, we recommend that you accept the default, because increasing the receive buffer pool size uses up more memory.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.34

Parameter:	**Initial Flow Control Credit**
Default:	7
Range:	1 through 50
Function:	Regulates the flow of data from the SDLC device to the SDLC interface.
Instructions:	Accept the default. This parameter is reserved for future enhancements.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.9

Parameter:	**Enable Stats Collection**
Default:	TRUE
Options:	TRUE | FALSE
Function:	Turns statistics collection on or off for this port.
Instructions:	Enter TRUE to enable statistics collection; otherwise, enter FALSE.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.2.1.35

Deleting an SDLC Interface

To delete an SDLC interface from its associated physical circuit:

1. **In the SDLC Interface Configuration window (refer to Figure 4-3), select the interface you want to delete.**
2. **Click on Delete.**

   The system deletes the SDLC entry you selected, and the entry disappears from the list of interfaces in the SDLC Interface Configuration window.

To simultaneously delete all SDLC interfaces from the node, follow the steps in the section “Deleting SDLC from the Router.”

Adding an SDLC Link Station

To add an SDLC link station:

1. **In the SDLC Interface Configuration window (refer to Figure 4-3), select Link Station.**

   The SDLC Link Station Configuration window appears (Figure 4-4).

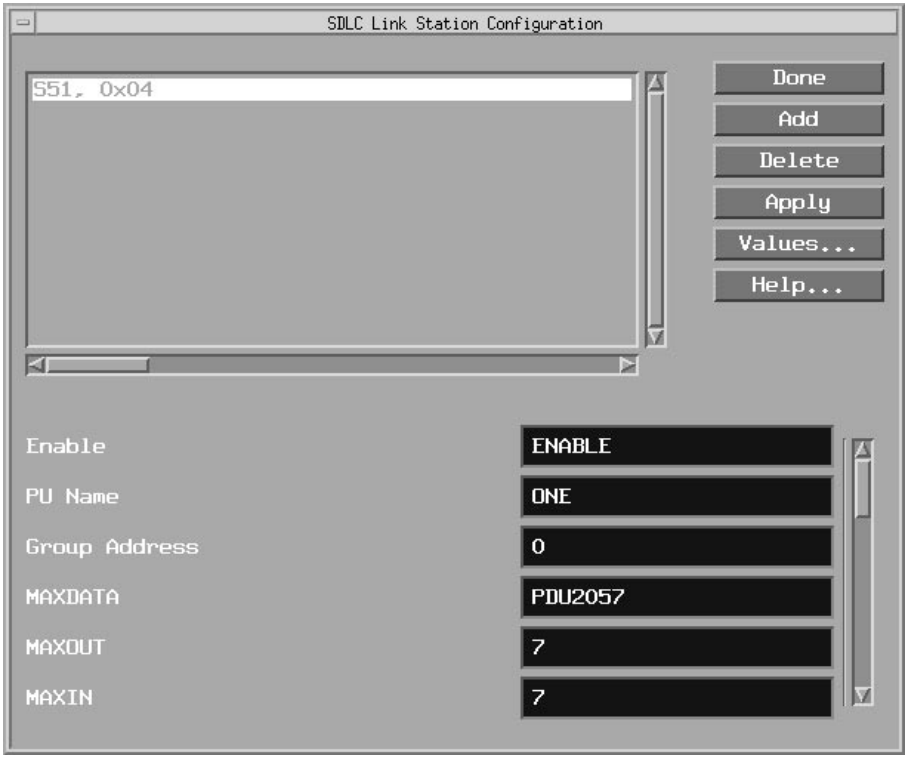

Figure 4-4. SDLC Link Station Configuration Window

2. **Click on Add.**

   A window prompts you for the address of the link station (Figure 4-5).

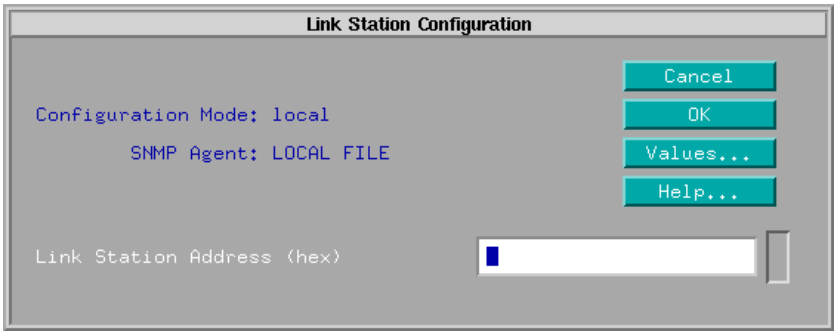

Figure 4-5. Link Station Configuration Window

3. **Enter the link station address.**

   Refer to the parameter description that follows this procedure.

4. **Click on OK to save your changes and exit the window.**

   The SDLC Link Station Configuration window reappears (refer to Figure 4-4) with the new entry added to the list of existing link stations.

   Complete the procedure in the next section, “Editing SDLC Link Station Parameters,” to define the configuration information for the link station you just added.

Note: If you are using SDLC with DLSw, you must configure a local device for each SDLC link station you add. For information, refer to *Configuring DLSw Services*.

Parameter:	**Link Station Address (hex)**
Default:	None
Options:	Any valid hexadecimal link station address from 0x01 to 0xFE
Function:	Specifies the address of the link station.
Instructions:	Type **0x** followed by the link station address.
MIB Object ID:	None

Editing SDLC Link Station Parameters

To edit SDLC link station parameters, complete the following steps. If you just completed the procedure in "Adding an SDLC Link Station," go to Step 3.

1. **In the Configuration Manager window (refer to Figure 4-1), select Protocols > SDLC > Link Stations.**

   The SDLC Link Station Configuration window appears (refer to Figure 4-4).

2. **Select the address of the link station.**
3. **Edit the link station parameter values.**

   For information, refer to the parameter descriptions in the next section.

4. **Click on Apply to save your changes.**
5. **Click on Done to exit.**

SDLC Link Station Parameter Descriptions

Use the following descriptions as guidelines when you configure the parameters in the SDLC Link Station Configuration window.

Parameter:	**Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables the link station on the port.
Instructions:	Enter Enable to enable the link station on the port; otherwise, enter Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.2

Parameter:	**PU Name**
Default:	APPN link station name or the NAME portion of the NETID.NAME; DLSw adjacent link station name
Options:	Any valid 8-byte ASCII name
Function:	Specifies the physical unit (PU) name of the adjacent link station. This name uniquely identifies the adjacent link station for statistics and Alert messages.
Instructions:	Enter the 8-byte ASCII link station name.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.32

Parameter:	**Group Address**
Default:	0 for APPN; None for DLSw
Range:	0 through 254
Function:	Specifies the address of the group to which this link station belongs (for secondary link stations only).
Instructions:	If the link station is not part of a group (as is the case in a point-to-point topology), accept the default. If the link station is part of a group, enter its group poll address.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.5

Parameter:	**MAXDATA**
Default:	PDU2057
Options:	PDU265 | PDU521 | PDU1033 | PDU2057
Function:	Specifies the maximum frame size SDLC supports. This value includes the transmission header (TH) and request header (RH).
Instructions:	Enter a maximum frame size equal to or larger than the largest frame size the station will receive.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.7

Parameter:	**MAXOUT**
Default:	7
Range:	1 through 127
Function:	Controls the maximum number of consecutive frames that an SDLC link station can send without acknowledgment.
Instructions:	Enter a value from 1 through 127.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.10

Parameter:	**MAXIN**
Default:	7
Range:	1 through 127
Function:	Controls the maximum number of unacknowledged frames that an SDLC link station can receive.
Instructions:	Enter a value from 1 through 127.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.9

Parameter:	**Response Timer**
Default:	400 milliseconds for APPN; none for DLSw
Range:	100 through 64000
Function:	Specifies the length of time that SDLC waits before turning the poll bit around when it has no work to do.
Instructions:	Enter a value from 100 through 64000.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.28

Parameter:	**RNR Timer**
Default:	3 minutes
Range:	1 through 90
Function:	Controls the length of time that an SDLC link station allows its adjacent link station to remain in a busy (RNR) state before declaring it inoperative. This parameter operates with the RNR Retry Limit parameter.
Instructions:	Enter a value from 1 through 90.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.15

Parameter:	**RNR Retry Limit**
Default:	4
Range:	1 through 64000
Function:	Used with the RNR Timer parameter to provide the overall timeout before sending an outage message to a device.
Instructions:	Enter a value from 1 through 64000, where 1 causes SDLC to generate an outage after the first RNR Timer expires, and 64000 specifies an infinite number of retries.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.27

Parameter:	**REPLYTO Timer**
Default:	30 tenths of a second
Range:	1 through 600
Function:	Specifies the maximum length of time a primary link station waits for a response frame (after sending a frame with a poll bit) before trying to poll another station. This timer starts when a frame without the F-bit is received, and stops only when a frame with an F-bit is received.
Instructions:	Enter a value from one tenth of a second through 600 tenths of a second. You should set the timeout value to be no less than the result of the following formula: (2 + MAXOUT) x (MAXDATA x 8) x 10 ÷ line speed in bits/sec Edit the REPLYTO Timer value whenever you adjust baud rate with the Internal Clock Speed parameter or the external modem baud rate. For example, if you are using a line with a 4800 baud rate, increase the REPLYTO Timer parameter to 60 tenths of a second.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.8

Parameter:	**REPLYTO Retry Limit**
Default:	10
Range:	1 through 64000
Function:	Controls the number of times an adjacent secondary link station fails to respond before the primary link station sends an outage message.
Instructions:	Enter a value from 1 through 64000, where 1 causes SDLC to generate an outage after the first REPLYTO Timer expires, and 64000 specifies an infinite number of retries.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.26

Parameter:	**Fast Poll Timer**
Default:	400 milliseconds
Range:	1 through 64000
Function:	Controls the timeout required before reinserting an adjacent secondary link station into the polling list, after the adjacent secondary station has been removed for no response. This parameter operates with the Fast Poll Count Limit parameter.
Instructions:	Enter a value from 1 through 64000. Although the timer value is in milliseconds, you should specify a value so that the timer runs for seconds.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.22

Parameter:	**Fast Poll Count Limit**
Default:	16
Range:	1 through 65535
Function:	Controls the number of times a link station is removed from the polling list on the normal poll timer, before SDLC switches to the Slow Poll Timer. This parameter operates with the Fast Poll Timer parameter.
Instructions:	Enter a value from 1 through 65535, where 1 causes SDLC to switch to the Slow Poll Timer after the first Fast Poll Timer expires, and 65535 specifies an infinite number of retries.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.23

Parameter:	**Slow Poll Timer**
Default:	1000 milliseconds
Range:	1 through 64000
Function:	Allows polling to continue (using this timer) when the Fast Poll Count Limit expires. This parameter operates with the Slow Poll Count Limit parameter.
Instructions:	Enter a value from 1 through 64000.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.24

Parameter:	**Slow Poll Count Limit**
Default:	65535
Range:	1 through 65535
Function:	Controls the number of times a link station is removed from the polling list before sending an outage message to a device. This parameter operates with the Slow Poll Timer parameter.
Instructions:	Enter a value from 1 through 65535, where 1 causes SDLC to generate an outage after the first Slow Poll Timer expires, and 65535 specifies an infinite number of retries.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.25

Parameter: **Pre-Activation Contact Frame**

Default: XID

Options: XID | DISC | SNRM | SNRME | TEST

Function: Specifies the frame to use for pre-activation polling. Pre-activation sets up the router connection table so that DLSw connects to the host before connecting to the SDLC station, or the reverse. The frames include

XID -- Exchange Identification
DISC -- Disconnect
SNRM -- Set Normal Response Mode
SNRME -- Set Normal Response Mode Extended
TEST -- Test

The XID default setting causes the router to establish a connection with the host before connecting to the SDLC link station. The line activates and the router sends the SNRM frame to the SDLC station. Selecting a value other than XID causes the router to send that value to the SDLC station before attempting to connect to the host.

Instructions: Click on Values and select one of the parameter settings, as follows:

- Accept the XID default setting to establish a DLSw connection with the host. When the connection succeeds, the router sends an SNRM frame to the SDLC station.
- Select SNRM to establish a connection to the SDLC station first. When the router receives a response from the SDLC station, it then establishes a DLSw connection with the host. This minimizes the logging of unavailable or nonresponding SDLC stations.

  You should use SNRM whenever the router is communicating with a remote LAN gateway, such as a 3174-11R with the LAN gateway feature. Additionally, use SNRM whenever you use group polling.
- Use DISC, SNRME, and TEST *only* if your network requires one of these options.

MIB Object ID: 1.3.6.1.4.1.18.3.5.1.7.5.1.30

Parameter:	**Fast Contact Timer**
Default:	4000 milliseconds
Range:	1 through 64000
Function:	Controls the timeout required before retransmitting an unacknowledged contact frame (SNRM or XID). For primary SDLC link stations only, this parameter operates with the Fast Contact Retry Limit parameter and is also used for special pre-activation polling.
Instructions:	Enter a value from 1 through 64000. The value you enter must be greater than the REPLYTO Timer value described earlier.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.16

Parameter:	**Fast Contact Retry Limit**
Default:	4
Range:	1 through 64000
Function:	Controls the number of times to transmit a contact frame (for example, SNRM) before switching to the Slow Contact Timer. This parameter operates with the Fast Contact Timer parameter.
Instructions:	Enter a value from 1 through 64000, where 1 causes the switch to the Slow Contact Timer after the first Fast Contact Timer expires. Enter 64000 for an infinite number of retries.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.17

Parameter:	**Slow Contact Timer**
Default:	4000 milliseconds
Range:	1 through 64000
Function:	Allows contact polling to continue (using this timer) when the Fast Contact Retry Limit expires. This prevents leased (multidrop) links from being overwhelmed by poll frames for absent stations. This parameter operates with the Slow Contact Retry Limit parameter.
Instructions:	Enter a value from 1 through 64000.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.18

Parameter:	**Slow Contact Retry Limit**
Default:	8
Range:	1 through 65535
Function:	Controls the number of times to transmit a contact frame (for example, SNRM) before sending an outage message to the SDLC device. This parameter operates with the Slow Contact Timer parameter.
Instructions:	Enter a value from 1 through 65535, where 1 causes an outage after the first Slow Contact Timer expires, and 65535 specifies an unlimited number of retries.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.19

Parameter:	**DISC Retransmit Timer**
Default:	4000 milliseconds
Range:	1 through 64000
Function:	Controls the length of time before retransmitting an unacknowledged Disconnect (DISC) command. This parameter operates with the DISC Retransmit Retry Limit parameter for primary SDLC link stations only.
Instructions:	Enter a value from 1 through 64000.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.20

Parameter:	**DISC Retransmit Retry Limit**
Default:	4
Range:	1 through 65535
Function:	Controls the number of times to transmit a Disconnect (DISC) command. This parameter operates with the DISC Retransmit Timer parameter.
Instructions:	Enter a value from 1 through 65535, where 1 causes an outage after the first DISC Retransmit Timer expires, and 65535 specifies an unlimited number of retries.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.21

Parameter:	**Poll Bit Set In I-Frame**
Default:	TRUE
Options:	TRUE | FALSE
Function:	Specifies whether this link station sends the poll bit on an Information frame. Certain SDLC implementations do not handle receipt of I-frames carrying the poll bit.
Instructions:	Enter TRUE if this link station can send the poll bit on an Information frame.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.7.5.1.31

Deleting SDLC from the Router

To delete all SDLC interfaces from the router, begin at the Configuration Manager window (refer to Figure 4-1) and complete the following steps:

1. **Select Protocols > SDLC > Delete SDLC.**
2. **Click on OK in the confirmation window.**

   Site Manager deletes the SDLC interfaces from the router.

Appendix A
SDLC Default Parameter Settings

Tables A-1 through A-3 give the default settings for SDLC parameters. Use the Configuration Manager to edit any of the Site Manager default settings shown here. Note that some SDLC parameters assume different defaults in Site Manager, depending on whether you are configuring APPN or DLSw.

Table A-1. SDLC Line Parameters

Parameter	Default Setting with APPN	Default Setting with DLSw
Clock Source	Internal	Internal
Internal Clock Speed	19.2 KB	19.2 KB
Sync Line Coding	NRZ	NRZ
Cable Type	RS232	RS232
RTS Enable	Disable	Disable

Table A-2. SDLC Interface Parameters

Parameter	Default Setting with APPN	Default Setting with DLSw
Enable	Enable	Enable
Port Name	APPN port name	Circuit name
Link Station Role	Negotiate	Primary
Link Station Address	4	None
Support Negotiable Connection	True	False
Max Frame Retransmit Count	5	5
Non-productive Timer	2000 ms	2000 ms
Non-productive Retry Limit	15	15
Idle Line Timer	6000 ms	6000 ms
Idle Line Retry Limit	20	20
Port Write Timer	3000 ms	3000 ms
Port Write Retry Limit	10	10
Link Connection Timer	3000 ms	3000 ms
Link Connection Retry Limit	10	10
Primary Full Duplex	False	False
Secondary Full Duplex	False	False
Enable Reject Frame	True	True
Max XID Size	256	256
Max Frame Size	PDU2057	PDU2057
Total Link Station Limit	16	16
Inbound Link Station Limit	8	8
Outbound Link Station Limit	8	8

(continued)

Table A-2. SDLC Interface Parameters *(continued)*

Parameter	Default Setting with APPN	Default Setting with DLSw
Receive Buffer Pool Size	7	7
Initial Flow Control Credit	7	7
Enable Stats Collection	True	True

Table A-3. SDLC Link Station Parameters

Parameter	Default Setting with APPN	Default Setting with DLSw
Enable	Enable	Enable
PU Name	Configured APPN Link Station Name or NAME portion of the APPN NETID.NAME	Configured DLSw Adjacent Link Station Name
Group Address	0	None
MAXDATA	PDU2057	PDU2057
MAXOUT	7	7
MAXIN	7	7
Response Timer	400 ms	None
RNR Timer	3 min	3 min
RNR Retry Limit	4	4
REPLYTO Timer	30 tenths of a second	30 tenths of a second
REPLYTO Retry Limit	10	10
Fast Poll Timer	400 ms	400 ms
Fast Poll Count Limit	16	16

(continued)

Table A-3. SDLC Link Station Parameters *(continued)*

Parameter	Default Setting with APPN	Default Setting with DLSw
Slow Poll Timer	1000 ms	1000 ms
Slow Poll Count Limit	65535	65535
Pre-Activation Contact Frame	XID	XID
Fast Contact Timer	4000 ms	4000 ms
Fast Contact Retry Limit	4	4
Slow Contact Timer	4000 ms	4000 ms
Slow Contact Retry Limit	8	8
DISC Retransmit Timer	4000 ms	4000 ms
DISC Retransmit Retry Limit	4	4
Poll Bit Set In I-Frame	True	True

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